

Description of GTK-35, ShVD-48 Cutting Machines;

Donbass Combine; Cutter Bits

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CONFIDENTIALDESCRIPTION OF GTK-35, ShVD-48 CUTTING MACHINES; DONBASS COMBINE;
CUTTER BITSThe GTK-35 Cutting Machine.

The new GTK-35 machine (G- Gorlovka Plant; T- Heavy; K- Rope; 35 kilowatts capacity) was built to replace the obsolete GTK-3M.

It was designed for working seams of 0.4 meters or more thick which are not easily worked by the larger KMP-1 and MV-60 cutters. In spite of its smaller dimensions, the GTK-35 has enough power to operate under hard-cutting conditions.

In addition to its greater power, the GTK-35 differs from the GTK-3M in that it has no disk friction clutch for the feed section, and has four working feed speeds adjustable through a ratchet element. This gives it speeds both lower and higher than that of the GTK-3M. The cutter section differs from that of the GTK-3M machine mainly in that it has a greater cutting speed, and a bug-duster similar to the one on the MV-60. The GTK-35 is longer and narrower, and weighs more than the GTK-3M, but is of the same height. Its cutter bar is of the same design and dimensions as that of the MV-60.

Specifications:

Type of electric motor	MA-191/35
Hourly capacity (kw)	35
Continuous capacity	20
Rpm	1,465
Cutting speed (m/sec)	2.0
Working feed speeds (m/min)	0.2; 0.4; 0.6; 0.8
Maneuvering feed speed (m/min)	12.0
Force exerted on rope, working (kg)	5,000
" " " " Maneuvering (kg)	3,000

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Maximum force exerted on rope (kg)	7,000
Diameter of rope (mm)	15-17
Capacity of rope drum (m)	30
Length of bar (m)	1.6-2.2
Type bugduster	helical
Type of plug connector (for cable)	ShV-9675
Type controller	KRV-3 ³ 006B J
Dimensions (mm)	
Length	2,685
Width	685
Height	305
Weight (kg)	2,550

A drawing of the GTK-35 cutting machine faces page 86; a diagram of the cutter section faces page 88; a diagram of the feed section faces page 89 of source document.⁷

The ShVD-48 Cutting Machine

In 1949 some experimental models of the ShVD-48 machine were put out. It is designed for working short walls 4-20 meters long, of flat-dipping seams less than one meter thick, with a pitch angle under 12 degrees.

The machine has a rectangular body, to which the bar is rigidly fixed. The cutter chain is identical to the one used on the KMP-1 machine; it is cast, and has twin-bit blocks.

The ShVD-48 is still in the experimental stage, and will probably undergo considerable modifications.

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Specifications:

Dimensions of body (mm)

Length	1,600
Height	680
Width	1,290
Length of bar (m)	2.4
Kerf thickness (mm)	140
Working speed of cutter chain (m/sec)	2.34
Electric motor, half-hourly capacity (kw)	35
" " , speed (rpm)	960
Number of rope drums	2
Rope drum capacity (m)	20
Rope diameter (mm)	17-18
Feed speed (m/sec)	
Working	0.63
Maneuvering	5.8
Force exerted on rope, working (kg)	6,000
" " " " maneuvering	2,000
Weight (kg)	3,000
Controller	KRV-3006B
Plug connector	ShVD-9603
Starter	PMV-1356

[Diagrams of ShVD-48 cutting machine appear on page 125 and facing page 126 of source document.]

The Donbass Combine

[Figures in parentheses refer to corresponding figures of drawing in source document.]

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The Donbass Coal Combine was built in 1948, from designs of group of engineers of the Giprouglemash Institute and the Gorlovka Machine Building Plant imeni Kirov.

It is built around the MV-60 cutting machine, with the feed section, and electric motor, MA-191/11 (2) unchanged. The cutter part (3) is special, and moves the cutter chain (4) of the looped bar (5). Behind the bar is the breaker rod (6), with special breaker bits (7), and shearing disks (8).

The coal extracted from the seam by the looped cutter chain is sheared by the disks, and broken by the breaker bar.

A looped loader (9), whose chain is fitted with special flights (10), is affixed to the looped bar. The loader is powered by a separate electric motor (11), which is turned on and off through the controller (12), set in a special housing on the feed section of the combine.

Flights of the loader moving along the under parts of the bar load the cut coal unto the face conveyer. A pugduster (13) ejects the cuttings onto the conveyer.

Cutter-Chain Bits

For soft cutting conditions, machines use GOST 4615-49 bits made of U7 carbon steel, without hard-alloy tips. They have a shank cross-section of 12x25 millimeters, and are 108 millimeters long; the top rake is 20 degrees; the tool angle, 45 degrees.

For soft to average-hard coal, GOST 4616-49 bits with fused-on tips of hard alloy are used.

For hard coal seams containing deposits of pyrites and other hard rock, KMZ-1 bits, (GOST 4617-49) are used. These bits are now produced by the Krasnyy Luch Machine Building Plant. They have

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a U7 steel shank of 12-x25-millimeter cross section, with a drop forged head containing an insert of VK-6 or VK-8 super-hard metallo-ceramic alloy. The bits are 95 millimeters long, have a top rake of 13 degrees, and a relief angle of 5 degrees. KMZ-1 bits are 10-15 times more durable in cutting hard coal than ordinary bits with fused-on tips, and their broad application has considerably raised the productivity of cutting machines. Using ordinary bits with fused-on tips to cut a hard-coal seam 100 meters long, it was necessary to replace 250-300 bits during a single cycle. The machine had to be stopped up to ten times to replace the bits, at a cost of 5 hours. Using KMZ-1 bits, the entire cutting cycle may usually be run with one set of bits; only three to four bits at the most will have to be replaced. In addition to the above bits, The Kopeysk Machine Building Plant puts out the "Ural" bit. This bit is similar in dimensions and shape to the KMZ-1, differing in the design of the hard-alloy insert and the material of the shank. The insert is in the form of a round truncated core, soldered into a drilled-out opening of the head. The shank is of heat-treated alloyed steel, and is extremely hard.

Both the Kopeysk and the Krasnyy Luch Plants put out "Ural" and KMZ-1 bits with shanks of reinforced cross section, measuring 16x32 millimeters. These bits work well under the hardest cutting conditions, but must be used by machines of greater power than those which normally use the other types of bit.

After ordinary 4615-49 and 4616-49 bits are worn down 4-5 millimeters, and are no longer fit for cutting, they may be restored by fusing on hard alloys after the heads have been heated and reworked on special machines. Bits 108 millimeters long may undergo four to five restorations, but only if the core of the bit has not undergone

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deformation, and if the sides of the head have not been worn away (usually the case with bits situated at the extreme angles of inclination from the horizontal plane of the bar).

GOST 4616-49 bits are fused over with various hard alloys: mark VK (GOST 3882), vokal [sic], likar [sic], stalinite, Kontorov alloy, iron powder, etc.

Vokal, likar, and VK alloy are applied in the form of crumbs or grains, and stalinite is applied in powder form.

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Mashinist Vrubovoy Mashiny, by Shuris, N. A. Moscow, 1950

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